

FEDERAL INLETS DATABASE

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Abstract: The U.S. Army Corps of Engineers' Coastal Inlets Research Program (CIRP) is developing a database of Federal Inlets to consolidate inlet characteristics and statistics in a conveniently accessible form and to identify information gaps. The Federal Inlets Database covers 153 inlets and entrances in the continental United States and Alaska that are Federally maintained, and it is a detailed subset of a larger database being compiled for more than 500 inlets of the United States. This paper describes the background of the Federal Inlets Database and its content. It also identifies selected research areas being pursued by the CIRP in completing and expanding the database. This paper introduces the Federal Inlets Database as a coastal engineering resource, and it requests assistance from the coastal engineering community to complete the database by providing local and unpublished knowledge of specific inlets in the United States.

INTRODUCTION

The U.S. Army Corps of Engineers' Coastal Inlets Research Program (CIRP) is developing a database of Federal Inlets to consolidate inlet characteristics and statistics in a conveniently accessible form and to identify information gaps. The Federal Inlets Database contains information compiled for 153 Federally maintained inlets and entrances in the continental United States and Alaska. For the CIRP mission, an inlet or entrance is defined as a maintained channel connecting an ocean or lake to a smaller water body and which experiences long-period water motion by tide or seiche, together with a wave-induced longshore current. Inlet channels contribute to economic vitality as commercial navigational waterways, are part of the military infrastructure of the nation, and are key components of the estuarine ecosystem. The Corps of Engineers maintains inlet navigability by dredging channels and through implementation and maintenance of controlling structures. Understanding the physical processes occurring at these inlets and entrances is required for predicting the evolution of the inlet and adjacent beaches, both under natural conditions and in response to engineering activities such as routine channel maintenance, channel deepening, and mining of ebb- and flood-tidal shoals.

The Federal Inlets Database presented here is in a developmental stage. Collection of additional data is necessary to fully populate it. The Federal Inlets Database will

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ultimately function as a continually evolving information center to maintain accuracy in recognition that inlet characteristic change through time. The Federal Inlets Database was organized with the goal of providing information on 42 hydraulic, geomorphic, and geometric parameters for Federally maintained inlets within the continental United States and Alaska. Much of this information is not readily available at this time, and the CIRP is requesting assistance of those possessing additional information to complete the database.

Presently the Federal Inlets Database is in Excel format. The CIRP is incorporating this database into its web-based inlet-structure database. The on-line database includes downloadable aerial photographs of many of the Federal and non-Federal inlets and is accessible at the CIRP web site <http://cirp.wes.army.mil/cirp/cirp.html> or may be found directly at the link <http://cirp.wes.army.mil/cirp/structdb/structdbinfo.html>.

LOCATION

One motivation for the establishment of the Federal Inlets Database was to obtain information on many inlets over a diverse range of locations. Figure 1 is an example of one region showing the large number of inlets to be treated. Inlets within the United States have widely differing wave conditions, tidal prisms, magnitudes and net directions of longshore sediment transport, structures, and physical geometries (as well as other parameters). Figures 2-8 illustrate this variability. Inlets within the database are listed by location beginning with the Corps of Engineers New England District and continuing along the perimeter of the United States, and ending in the Detroit District along the Great Lakes.

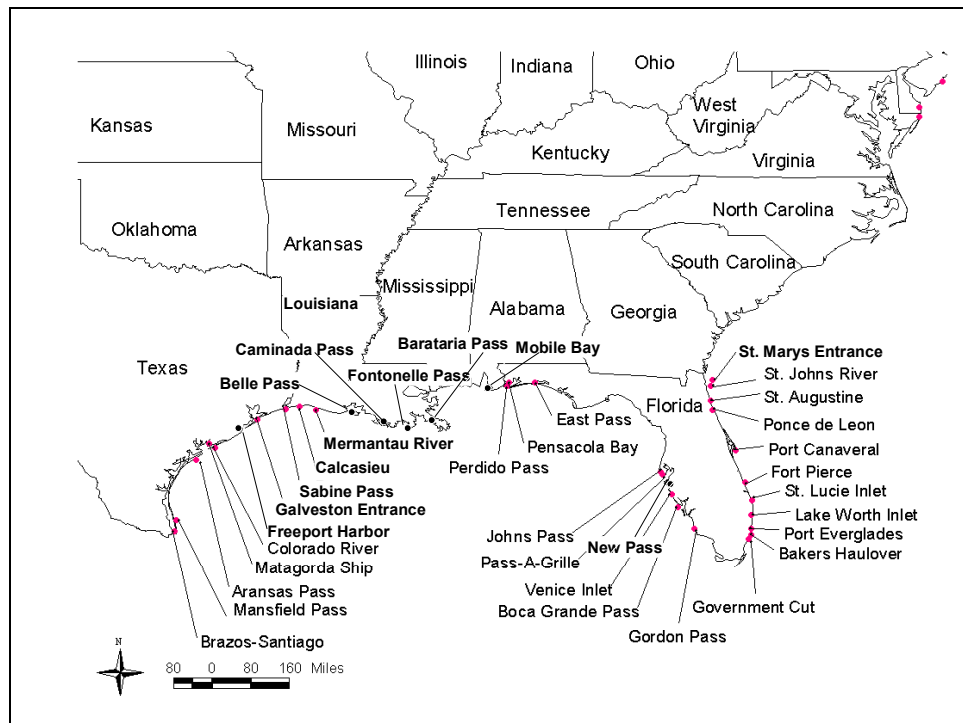


Figure 1. Example of regional map for the Southeast coast of the United States

The inlets contained within the database are located within 25 states and are maintained under the direction of 19 Corps of Engineers Districts. The following is a listing of those managing District offices and the corresponding states containing inlets for which they are responsible. The inlets contained within the Federal Inlets Database include those with one, two, or no jetties, are located along all coasts of the United States, and are of different sizes. Examples of the inlet conditions and locations include:

<ul style="list-style-type: none"> • New England (NAE): Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut • New York (NAN): New York, New Jersey • Philadelphia (NAP): New Jersey, Delaware • Baltimore (NAB): Maryland • Norfolk (NAO): Virginia • Wilmington (SAW): North Carolina • Charleston (SAC): South Carolina • Savannah (SAS): Georgia • Jacksonville (SAJ): Florida • Mobile (SAM): Florida, Alabama 	<ul style="list-style-type: none"> • New Orleans (MVN): Louisiana • Galveston (SWG): Texas • Los Angeles (SPL): California • San Francisco (SPN): California • Portland (NWP): Oregon, Washington • Seattle (NWS): Washington • Alaska (POA): Alaska • Buffalo (LRB): New York, Ohio • Detroit (LRE): Michigan, Wisconsin, Minnesota
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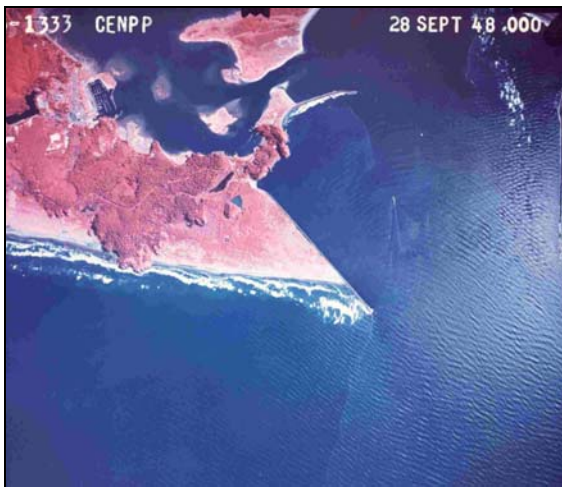


Fig. 2. Columbia River, WA/OR (large)



Fig. 3. Venice Inlet, FL (small)



Fig. 4. Government Cut, (Miami) FL (jettied)



Fig. 5. Pensacola Bay Ent., FL (no jetties)



Fig. 6. Moriches Inlet, NY (Atlantic)



Fig. 7. San Francisco Bay, CA (Pacific)



Fig. 8. Colorado River mouth, TX (Gulf Coast)

PARAMETERS & STATISTICS

The Federal Inlets Database contains a wide range in values, for example, tidal prisms on the order of $1.87 \times 10^9 \text{ m}^3$ for the Columbia River on the border of Oregon and Washington states, and as small as from $0.84 \times 10^6 \text{ m}^3$ for Sabine Pass, Texas. The database contains entries varying greatly in size of inlet, wave exposure, tidal prism, and number of jetties. Inlets with no jetties, one jetty, and two jetties are represented. Table 1 lists 42 hydraulic, geometric, and tidal parameters to be included within the Federal Inlets Database, and Table 2 presents the inlets with some of the highest and lowest values for each parameter.

Table 1. Parameters Contained with in the Federal Inlets Database

- | | |
|---|---|
| • Inlet Name | • Date of Recent Spring Tidal Prism |
| • State | • Average Tidal Range, m |
| • District | • Spring Tidal Range, m |
| • Latitude | • Spring Discharge, m^3/sec |
| • Longitude | • River Average Discharge, m^3/sec |
| • Minimum Width, m | • River Maximum Discharge, m^3/sec |
| • Number of Jetties, 0,1,2 | • Previously Documented Tidal Prism, m^3 |
| • Weir, Y, N | • Previously Documented Cross Section, m^2 |
| • Location of Weir (N,S,E,W) | • Representative Average Net Longshore Sediment Transport, m^3/yr |
| • Number of Breakwaters | |
| • Recent Spring Tidal Prism, m^3 | |

- Direction of Representative Average Net Longshore Sediment Transport, degrees
- Direction of Representative Average Net Longshore Sediment Transport, N, S, E, W
- Representative Minimum Net Longshore Sediment Transport, m³/yr
- Representative Maximum Net Longshore Sediment Transport, m³/yr
- Representative Average Gross Longshore Sediment Transport, m³/yr
- Representative Minimum Gross Longshore Sediment Transport, m³/yr
- Representative Maximum Gross Longshore Sediment Transport, m³/yr
- Representative Wave Height, m
- Representative Wave Period, s
- Median Grain Size, mm
- Recent Minimum Channel Cross Sectional Area Below MSL, m²
- Representative Average Annual Entrance Dredging, m³/yr
- Representative Minimum Annual Entrance Dredging, m³/yr
- Representative Maximum Annual Entrance Dredging, m³/yr
- Maintained Channel Depth Over Bar MLLW, m
- Maintained Channel Width Over Bar MLLW, m
- Average Dredging Depth Over Bar, m
- Maintained Channel Depth Between Jetties MLLW, m
- Maintained Channel Width Between Jetties MLLW, m
- Advance Dredging Depth Between Jetties, m
- Orthogonal of Shoreline, N, S, E, W, NA
- Comments

Table 2. Selected parameter extremes of inlets within the Federal Inlets Database (preliminary)		
Parameter	Higher Value / Inlet Name	Lower Value / Inlet Name
Minimum Width, m	9,600 m / Willapa Bay, WA	190 m / Chincoteague Inlet, VA
Representative Average Net Longshore Sediment Transport, m ³ /yr	5x10 ⁶ m ³ /yr / Columbia River, OR/WA	1.07x10 ⁴ m ³ /yr / Frankfort Harbor (Lake Michigan), MI
Representative Average Gross Longshore Sediment Transport, m ³ /yr	1.51x10 ⁷ m ³ /yr / Columbia River, OR/WA	1.60x10 ⁵ m ³ /yr / St. Lucie Inlet, FL
Representative Wave Height, m	2.1 m / Grays Harbor, WA	0.5 m / Murrells Inlet, SC
Representative Wave Period, s	10 sec / Grays Harbor, WA	4.4 sec / Gordon Pass, FL
Median Grain Size, mm	0.82 mm / Venice Inlet (Casey's Pass), FL	0.21 mm / Gordon Pass, FL
Representative Average Annual Entrance Dredging, m ³ /yr	7.50x10 ⁶ m ³ /yr / Savannah River, GA	1.31x10 ³ m ³ /yr / Wilson Harbor (Lake Ontario), NY
Maintained Channel Depth Between Jetties MLLW, m	16.76 m / Columbia River, OR/WA	2.44 m (inner channel) / New Pass, FL
Maintained Channel Width Between Jetties MLLW, m	609.6 m / Columbia River, OR/WA	18.29 m / Mispillion River, DE

DATA VERIFICATION

The data sets presented in the Federal Inlets Database were developed from sources within nineteen Corps of Engineers Districts, from university and consulting industry reports, and from individuals conducting research at various tidal inlets throughout the study region. Values presented in the database are representative. Many of the parameters reported, such as tidal prism, are not constant and vary over different time scales and in response to engineering activities such as dredging and dredge and fill. Therefore, the year of measurement is noted in the database. In many cases, however, only one value was reported without a corresponding date because of limited data available for the particular inlet. These values must be taken as estimates for the inlets and considered with caution.

Work is ongoing to populate the database and validate numbers, historical and recent, that it contains. Primary sources of the information are also being linked as metadata and for reference to other, associated information.

CONCLUSIONS

The intent of this effort is to gather the necessary data to enable coastal engineers and scientists to more fully understand the physical processes occurring at those inlets of economic and environmental interest to the U.S. Army Corps of Engineers. The focus of this specific work is to expand the database to include all inlets, Federal and non-Federal, within the United States and its territories. Work is underway to include non-Federal inlets, with that database containing more than 500 entries at present.

In addition to being a scientific resource, it is anticipated that the database will be consulted to develop reliable and cost-effective engineering solutions.

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